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Foulbrood.

ITS CAUSE, SOURCE, AND CURE.

[CONCLUSION.]

In a preceding paragraph of this article we have spoken of the composition of pollen, and shown its aptitude for and tendency to decomposition under the influence of moisture and heat. We have also sought to exhibit the effects which this decomposing substance is qualified to exert on other organic substances with which it comes in contact. We shall now endeavor to demonstrate the correctness of these views by the following convenient and conclusive experiment:

Put about $\frac{1}{4}$ of oz. of pollen in a small glass phial or flask, and into another similar flask pour pure water to the depth of an inch; then connect the two flasks by a bent glass tube passed through and fixed in the corks. Now suspend in the first named flask a small strip of paper which has been dipped in a saturated solution of sugar of lead, and secure it by the cork so as to prevent it from touching the water. If the changes which take place in the course of a few days be now carefully noted, the following will be observed: The mass in the first flask becomes slightly turbid, and numerous air-bubbles will be seen continually rising in it. This is carbon which, uniting with the oxygen liberated at the same time forms carbonic acid gas which passes through the glass tube into the second flask, where it is absorbed by the water. The strip of paper there suspended now assumes a brownish hue, as the lead it contains has a stronger affinity for sulphur, the latter is attracted from its just formed combination with the liberated hydrogen, and forms sulphate of lead. The nitrogen meantime arising from the pollen combines with the hydrogen, forming ammonia, which is retained temporarily by the water in which it is generated.

After this putrefactive decomposition of the pollen has been fully completed, a small quantity of matter remains in the flask as a residuum, which is called the ash. It contains the solid mineral substances taken up by plants through their roots. This decomposition may therefore

be regarded as a species of combustion by humid process, because when pollen is burned in a platina cup, we obtain a residuum of ashes precisely similar in quantity and weight.

The principal elements contained in the pollen may now be readily determined. The presence of sulphur has already been detected by the formation of sulphate of lead on the strip of paper. The presence of nitrogen and hydrogen may be shown by our search for ammonia, which is a chemical combination of these two substances. Take a portion of water from the second flask and heat it in a porcelain cup, drop into it a small piece of caustic lime, and the pungent odor arising betrays the discharge of ammonia. To show the presence of carbon, combined to form carbonic acid, dissolve caustic lime in soft or rain water, and when the solution has become clear, pour some drops of it in a portion of the fluid contents of the second flask. The carbonic acid of this will immediately combine with the lime in the solution, forming carbonate of lime and rendering the water turbid. Thus are shown the chief elementary constituents of pollen.

Next, to acquaint ourselves with the effects which decomposing or putrefactive pollen has on honey, we resort to the following experiment: In a glass vessel place $\frac{1}{4}$ oz. of pollen crushed and comminuted between the fingers. Pour thereon $\frac{1}{4}$ oz. of pure water, and let the mixture stand several days in a warm place, till a perceptible commotion is generated, and numerous air-bubbles rise—the mass alternately swelling and subsiding. Now pour it into another glass vessel containing $\frac{1}{4}$ oz. of honey dissolved in $\frac{1}{4}$ oz. of water, and set this also in a warm place. In a short time the putrescence of the pollen will have communicated itself to the honey; alcohol and carbonic acid will be evolved, and the former converted into acetic acid by the free admission of oxygen. We may also remark in passing, that by heating in combination with nitric acid, chromic acid, sulphuric acid, manganese, &c., we can produce the volatile formic acid, which is the poison infused by the bee into the wound when stinging. But of this we shall treat more fully hereafter.

From the foregoing it is evident that putres-

cent pollen placed in contact with a solution of honey, can generate new substances possessing different and peculiar properties; and that consequently the utmost caution is requisite, when harvesting honey, not to mingle with it any decomposing substance. The result of the admixture of putrescent pollen would be decomposition (fermentation, as we term it) and the liberation of a glutinous substance contained in the pollen, which is the *ferment* whereby, in the body of the bee, wax is eliminated from saccharine, and from which the organism of the insect probably derives its formative tendency in appropriating nitrogenous nutriment. Thus, without pollen no ferment, without ferment no secretion of wax by the bees, and without this process no bees.

If not altogether as thus indicated, still in a manner substantially analogous, do those pollen particles operate which have, by means of the ferment they contain, been brought into state of putrescence, and being mixed with the chyme prepared for the brood, are introduced into the delicate bodies of the larvæ, and there brought in close contact with other readily decomposable substances. So long as the workers digested the chyme administered, the action of destructive element lurking therein was in large measure suppressed and its destroying force mitigated. But when this preparatory action ceases, and the delicate creatures receive for food honey and fermenting pollen undigested, they partake of that "whose mortal taste" brings death unto them. The fermenting pollen particles, or rather the putrescent matter into which they have been converted, becomes immediately disseminated through their organism. This is speedily destroyed and decomposed, and the amazed and dismayed beekeeper finds the cells filled with a putrid and fetid mass, which when dried up is partially thrown out by the surviving workers. Behold here, foulbrood in its incipency, and running on to fatal maturity. The deadly miasmatic gases (sulphureted hydrogen, ammonia) developed from the ever increasing number of dead and decomposing larvæ, affect nearly the entire mass of brood, and multitudes of mature bees perish, till the whole colony succumbs and the entire apiary and those of the vicinage are infected, unless by some timely remedy the progress of the malady is arrested.

We shall here indicate only briefly how foulbrood is disseminated. We call the substance which transmits disease from one body and place to another, miasm—which is usually understood to emanate from decaying and putrifying animal or vegetable matter. It is hence likewise generated in hives that are suffering from foulbrood. Miasms are probably composed of minute particles of matter in a putrescent state, which floating in the air diffuse the contagion in every direction in which they are borne. They may thus find access to hives through the entrance, or be carried in by the bees to whose bodies they adhere; and the disease may likewise be carried from a foulbroody hive to a healthy one, if the bees of the latter pilfer the former of its sweets. Analogous observations have been made of the diffusion of malarious diseases

from marshy districts, whereby the morbid matter of typhoid and other epidemics has been spread over large areas; and which is attributed to the inhalation of the sporules of a species of fungus found in such districts. The fatal disease, too, to which silkworms are subject—known as muscardine—springs from a species of fungus developed in the bodies of the worms and fostered and spread by the contaminated atmosphere of the cocoonery.

It is hence apparent that foulbrood may be communicated from infected to healthy colonies by means of miasmatic corpuscles; and it is this circumstance precisely which give the disease its fearful character; and it is to the progress of chemical science that we are indebted for the means of controlling and counteracting this danger properly, and of finally subduing and eradicating the evil. Indeed, a more intimate acquaintance with nature, and with the powers and resources of science, serves more and more to elucidate many mysterious points, and aids in the solution of many a puzzling problem—enabling us to diminish or prevent some of the ills of life, or helping us greatly to enhance its enjoyments.

We shall in due course state the remedial means to be resorted to for the eradication of the evil, after giving a brief resume of what has already been said respecting its nature and source.

The name of the disease certainly indicates its character plainly enough—the brood becomes putrid. As the nitrogenous pollen readily undergoes decomposition under the influence of heat and moisture; and as this result can easily be produced by the vapor and humid exhalations condensed in the hive, just as we often see it on the windows of our houses; and as the putrescent matters are able to cause similar putrefaction in nitrogenous substances with which they are placed in communication or contact; and especially as the nursing bees mix the putrescent pollen with honey when preparing food for the larvæ, these at once become affected by the contagion and perish. Consequently foulbrood is only the result of the progressive putrescent decomposition of pollen particles within the larvæ, which destroys the bees in their incipient existence as brood, and by contagion or miasmatic diffusion spreads itself from hive to hive and from one apiary to another.

"A dreadfully devastating malady!" exclaimed an old beekeeper, on hearing foulbrood mentioned, "it brought me to the brink of ruin, by the destruction of more than forty of my colonies." We could in fact give this brood-pestilence no more appropriate name; and the magnitude of the evil was sufficient ground to seek for or devise means by the application of which we can avert the serious injury it is calculated to inflict. Relief was indeed sought for in empirical prescriptions and specific nostrums, but with no benefit whatever, as they were aimed at the consequences of the malady, and not against the malady itself. Finally, recourse was invariably had to the beekeepers' catholicon—the brimstone pit, as the certain and efficient cure-all. Undoubtedly, when the case seemed hopeless, the continued spread of the disease was enough

to drive the hapless apiarian to despair, and excuse him for resorting to so desperate a remedy. We speak from personal observation, and possibly it may be of service to some desponding reader to learn how great has been the damage sometimes sustained from this cause.

About twenty-five years ago Mr. S. sold to Mr. J. his well-arranged apiary, consisting of fifty colonies, with a number of empty hives, a wax press, and other requisites, for the apparently exceedingly low price of one hundred dollars. For the purpose of saving honey the bees had been kept in a dark chamber during the winter, with the hives immersed in sand, and ventilation supplied by means of tubes inserted in the entrances. On their removal in the spring most of the combs were found to be mouldy and soiled by fecal discharges; and the population was greatly reduced, evidently in consequence of this "economical" mode of "wintering." The bees appeared to be utterly despondent, probably from an inkling of the fate that awaited them, if their confinement were much further prolonged—not even the proffered food seeming to revive them. About the first of May, the weather being fine and pasturage plentiful, we examined them thoroughly at the new owner's request, and found, as we had previously surmised, that more than two-thirds of the colonies were foulbroody. The bees were comparatively few in number and languid in deportment, and speedy destruction was evidently impending. At the suggestion of an old bee-father, a few drops of the oil of cinnamon had been mixed with their food, without producing any perceptible benefit. Time wore on, the disease increased in extent and virulence, and by the middle of July, the poor man had not a single colony remaining of the fifty he had bought, besides losing ten more which he had previously owned, and he abandoned the business. The apiary of one of his neighbors also became infected; and before the ensuing spring he lost twenty-five colonies—his entire stock. We did not learn whether he made any renewed attempt at beekeeping, after sustaining so heavy a loss.

Dampness, partly derived from the sand in which they were imbedded, and partly caused by defective ventilation, thoroughly pervaded the hives, causing mouldiness of the combs, and inducing fermentation and decomposition of the pollen. The bees had been prevented from issuing to discharge their faeces; the combs were soiled, and an intolerable stench issued from the hives when opened. All the circumstances concurred to generate foulbrood, and hasten the lamentable issue already described. The moral of the sad story is, that bees, hives, and honey should only be bought from intelligent, competent, and trustworthy beekeepers; and that no new-fangled mode of wintering should be tried on a large scale, till after it has been thoroughly and repeatedly tested in a small way. "Prove all things," is a good maxim; but the test should be made within prudent and safe limits. Bees are certainly not moles, to feel comfortable when buried in sand. They require a domicile in which they are adequately sheltered from the inclemency of the weather

and extremes of heat or cold. Proper ventilation should convey away exhalations, which, if in excess, may become noxious; and on mild sunny days at the close of winter, the bees should be allowed to fly to rid themselves of faeces accumulated by long confinement. But whither are we wandering—led away by the remembrance of the melancholy mishaps of our beekeeping friends? Let us resume our proper task, to explain how foulbrood may be infallibly cured.

We conceive that, in the foregoing, we have satisfactorily shown where the source of foulbrood is to be looked for. If we have traced the source and cause of the disease to the putrefactive decomposition of pollen, it naturally follows that we should search for and remove such pollen from foulbroody hives—carefully burning it, to prevent further damage. As such operations must be performed in a thorough manner, it will at once be conceded that convenient and effectual removal can only be effected where movable comb hives are employed; and we therefore cannot refrain from recommending them for general adoption.

To remove and cure foulbrood proceed as follows:

Early in the morning of a fine, clear, warm day carry the foulbroody hive to a moderately warm room, well lighted with close windows. Remove comb after comb, brushing off the bees, and cut out all the cells containing pollen or brood. Fill the vacant spaces thus caused, by inserting pieces of worker combs from healthy stocks, using such, if possible, as are supplied with eggs, and fastening them in the usual manner. The pieces of comb cut out should immediately be burned or buried, or at least made inaccessible to bees. If the hive have a movable bottom board, anoint its lower edges with twenty or thirty drops of pyroligneous acid. Then set it on three equidistant triangular strips of board, so as to elevate it slightly from the ground, and burn within it a square inch of linen dipped in melted brimstone—repeating this fumigating, at intervals, two or three times. Then carry the hive back to its stand, open the windows of the room, to allow the bees collected there to pass out and return to their home. The pollen having been altogether removed from the hive, a shallow box or plate containing oat meal, should be set out for the bees near its entrance. We recommend oat meal for this purpose, as it abounds in nitrogenous elements, and is hence well adapted to supply the wants of the bees. As an after cure and stimulant furnish them with honey diluted with water, and slightly warmed. The bees will thus more speedily recuperate; the queen being fed will be encouraged to commence laying earlier than she otherwise would do; and the population roused to recommence their wonted labors.

When hives have fixed combs, it is of course necessary to operate in a somewhat different manner. The readiest mode is, to stupify the bees, transfer them to an empty hive, cut out the pollen and food, and then proceed as above directed.

It is generally known that the sulphurous acid developed by burning brimstone (composed

of one atom of sulphur and two atoms of oxygen— SO_2) renders innocuous the contagious or infectious matter generated in confined spaces; and hence the intelligent reader will understand why we recommend repeated fumigations with brimstone.

The reason why we advise anointing the lower edges of the hive with pyroligneous acid is because the creosote it contains possesses the peculiar property of arresting as well as of preventing putrefactive fermentation. But as the acid has the strong and penetrating odor of creosote, the quantity applied should be so small as not to injure or annoy the bees, by superinducing prolonged excitement.

Foulbrood most commonly manifests itself in the spring, and that is the time when the curative operation can be most conveniently employed. Nevertheless, should the disease occur in the summer, or later in autumn, the same curative process should still be employed, as the colony will thereby be certainly saved, and the pestilential malady be infallibly arrested and destroyed.

We part from the reader with the assurance that it affords us heartfelt gratification to have been able to devise, from observation and science, a process by which a disease known to be disastrous and hitherto deemed incurable, may certainly be eradicated at small cost of time and labor.

Observation of nature and her forces, as well as of the substances generated by them, their composition and decomposition, enables us to consider these in their diversified aspects; while science illumines the obscurity in which many of these substances and tissues are involved, the inner structure thus laid bare and exposed to view enables the inquirer to scan them with sincere gratification, in their life and workings within their innermost recesses.

BORNUM.

A. LAMBRECHT.

[For the American Bee Journal.]

The Past Season.

The past season has been a very poor season here for bees. Mine were partially ruined at first when I took them out in March. The weather was then warm, which started them to brooding. April was very cold, with frosts near to zero, which killed a great many. The summer was very dry and hot, and the flowers did not last long. The basswood flowers did not last over a week. As a consequence, a great many hives all over the country are light, and I do not think one half of them will winter.

I like the BEE JOURNAL very much.

JAMES MCCLAY.

MADISON, WIS., Nov. 9, 1868.

There is some foundation to suspect that the *heroic love* in bees, either for their queen or for their posterity, is only at bottom a self-interest-ness. It is of great moment to them to be, even in life-time, a mighty people. The cold weather would destroy them if their great numbers did not sufficiently warm the hive; and their numbers depend on the fruitfulness of the mother.

—Wildman.

[Communicated for the American Bee Journal].

Ligurian for, and Anonymi from, the Cape of Good Hope.

Rather more than two years ago, a gentleman about to leave England for Cape Town applied to me to supply him with a stock of pure Ligurian bees, packed in such a manner as should enable him to convey them by mail steamer to his new African home with a fair chance of their surviving the voyage. After having in 1862 succeeded in the far more difficult task of transporting Italian bees to the antipodes, I had, of course, every confidence in my ability to pack them for the shorter journey to the Cape of Good Hope, and had, therefore, little fear as to the result, when, on the 10th of September, 1866, the Royal Mail Steamer, belonging to the Union Steamship Company, took her departure from Plymouth for Africa with decidedly more emigrants on board than usual, seeing that in addition to her ordinary complement of passengers, she conveyed some thousands of the genus *Apis*, probably the first of their species ever exported to that continent, which already possesses more than one indigenous variety of the honey bee.

Although, as I have said, feeling but little anxiety as to the result, I have from time to time given a thought to the fate of those involuntary little voyagers, and have often wondered whether, after being the first to succeed in introducing the Ligurian variety of honey bee into England, and afterwards in exporting it to Australia, I should also be successful in transmitting it to Africa. These speculations, however, remained in abeyance until February in this year, when a letter reached me from the Cape, by which I learned that the Italian stock had reached that colony in safety, but vastly diminished in numbers, nearly five thousand having died. However, after sundry difficulties, they had ultimately been established, and the object which my correspondent had in writing was to obtain from me two more Ligurian stocks, he having unfortunately lost his only pure-bred Italian queen through an accident, at a time when there were no drones in the hive.

He also informed me that he had found at Cape Town two native varieties of the honey bee—"one small black, and the other, except in size, the exact counterpart of the Ligurian," and most kindly offered, if I would like to have a stock, to try his hand at packing one, and to send it by steamer to Plymouth. Turning this description over in my mind, I came to the conclusion that the variety which, except in size, was the exact counterpart of the Ligurian, could be no other than my old friend, or considering the terms on which we eventually parted, I might rather say enemy, the ferocious Egyptian bee, *Apis fasciata*, which so nearly simulates the Italian variety that the Rev. H. B. Tristram, author of "The Land of Israel," who found it amazingly abundant in Palestine, was misled into declaring that *Apis ligustica* was the common Holy Land insect. This conjecture was confirmed in a subsequent letter from my South African correspondent, wherein

he stated that his experience of the "diminutive of the Ligurian" was similar to my own in that they were "very savage." It is certainly not a little singular that identically the same variety of honey-bee should be found in the extreme south as exists in the north of Africa and adjoining parts of the Asiatic continent; but as, although separated by so vast a distance, it was but too apparent that there was no amelioration in the pugnacity of their disposition, I respectfully declined to avail myself of the opportunity thus offered of renewing my acquaintance with the "pretty yaller gals," electing rather to transfer my attentions and pay court to the very interesting but anonymous little African "niggers," which my friend had somewhat vaguely described us "small black" bees.

Pending the receipt of farther intelligence, I made an effort to penetrate the incognito of my intended *protégées* by submitting the question to my friend Mr. F. Smith, the distinguished hymenopterist of the British Museum, who, however, could only surmise that "the small black bee possibly is the *A. Adansonii* of Latreille, which I suppose to be synonymous with *A. nigritarum* of St. Payeau—*A. unicolor* of Latreille, and which M. Gerstäcker considers a variety of *A. mellifica*." I am of course unable to say how far this hypothesis may be correct, but supposing the small black bee of the Cape to be merely a variety of *Apis mellifica*, it is difficult to imagine how the native species or varieties can exist together in the same locality and yet keep themselves distinct. We know with what facility *A. mellifica*, *A. ligustica*, and *A. fasciata* will cross and interbreed with one another, and that this is at least equally the case on the continent of Africa is proved by one of my correspondent's letters, wherein, referring to the breeding of Ligurians in connection with Mr. Köhler's process, he says "it is the one thing required here, where bees of at least two or three kinds are common." These speculations can, however, only be set at rest by the arrival in England of the *anonymi* themselves, which I now hope may be deferred until next spring, although I have been expecting them during the past two months. My last letter from the Cape, dated the 18th of July, says, "Our native bees do not much like the notion of taking a voyage, at least so it seems, as two or three I have been preparing for you have deserted their boxes entirely, leaving brood in all stages, and betaken themselves to their native mountain wilds. I have four or five however, now well established, and hope either by next mail, or perhaps a month hence to be able to pack one or two off in such condition as to reach home alive. So don't be surprised at hearing some Africaners knocking at your door."

Although no "Africaners" have as yet knocked at my door, it will not now be very long before their own country is again the scene of an Italian invasion, for the Royal Mail steamship "Saxon," which took her departure from the port of Plymouth early in the morning of the 10th of October, was freighted with two strong bodies of apian Garibaldini in the shape of a couple of Ligurian stocks, which by the kind offices of a local friend were carefully

stowed on board in capital condition, and which, by the time this article appears, will have landed on that coast "where Africa's sunny fountains roll down their golden sand."

T. W. WOODBURY,
("A Devonshire Beekeeper.")

MOUNT RADFORD, Exeter, Eng., Nov. 3, 1868.

[For the American Bee Journal.]

Shape and Size of Hives.

MR. EDITOR:—I shall have to enter into the controversy in regard to the shape and size of hives—shallow ones in particular—not so much in their defence as to give my opinion as to their alleged defects, the reasons thereof, and their remedies.

1st. Their uncertainty for wintering, without burying.

2d. Their liability to be infested by the moth worm.

3d. The charge of some that the bees do not build straight combs.

4th. The trouble of getting out a comb from a full hive.

First. This depends a good deal on the avarice of beekeepers, who wish to get a large surplus of honey, or profit, from their bees without any corresponding outlay on them. No farmer expects to have fat cattle without feeding plenty of hay and grain; and no beekeeper should expect profit from his bees without providing good warm hives, not simply a nail keg or a soap box; but such a one as is described by Mr. Langstroth in his work, "*The Hive and Honey Bee*." I refer to the double-story hive, in figures 19, 20, 21, 22, and 23, on pages 48, 68, 86, and 96.

But, instead of glass hives, have the inside boxes made of lumber, and, with the two following alterations, and you will have a hive that possesses all desirable good qualities. The first is to have a bottom, either loose or stationary, to the base of the lower inside hive, and under that bottom nail strips half an inch thick and one inch broad, so that when placed inside of the outer case of hives, there will be a dead air space between it and the bottom of the outer case. Thus with the two bottoms of outer case and the bottom of inner hive, you have three bottom boards, and two dead air spaces between them. Having done this, you will have to make an alteration at the entrance to correspond. Cut the entrance hole $1\frac{1}{2}$ inches higher; then put a piece of $1\frac{1}{2}$ inch plank, the width of the entrance, on the bottom of the outer case in front for the bees to alight on, beveling the plank to the front.

The second alteration is: Instead of nailing the top boards of outside case cover to the sides as per directions, make a frame of strips one inch wide and two inches deep, just large enough to slip over the top of the sides, and nail the top board to the frame, forming a cover after the fashion of that of a pasteboard bandbox, and which can be removed so as to pack straw or chaff between the hive and the outer case in winter—which cannot be done if the top is made according to the directions in the

the book. Thus you will have a hive that will winter any swarm of bees on its summer stand.

Second. Their liability to be infested with the moth worm. From all the observations that I have been able to make, either with my own hives or those of my neighbors, this was owing either to defects in construction, or the material shrunk after the hives were made—allowing the frames to touch either top or bottom or both. In making new hives I would not have the frames go nearer the bottom than one inch, nor within five-eighths of an inch of the top. To cure old hives infested with worms, nail strips at top and bottom to make the inside of the hive correspond with the above directions.

You will find worms in every hive if the bees have not free access all around the frames, particularly at top and bottom; and you very seldom find any if they have—though not more so than you will find in any other hive of any other make, pattern, kind, or patent, under the same circumstances.

Third. The charge of some that bees will not build straight combs. Last season my bees filled nearly ninety frames with combs, every one of which was straight. I melted some wax, and waxed the under side of the tops of the frames and the inner sides of the side pieces. Some of the hives were tipped, and some were not.

Fourth. The trouble of getting frames out of a full hive. Put in only nine frames; then, instead of the tenth, put in a partition board made so as to hang like a frame, but to fit close to the top, bottom, and sides. To take out a frame, cut the connections, if any, between the frame and the partition board; take out the partition board, and you can then easily move the frames so as to take out the only frame you desire to remove.

The movable division board also allows you to make the inside of the hive to suit a large swarm of bees or a small one.

Besides double hives form warm and comfortable quarters in comparison with the wretched makeshifts provided for their bees by the generality of beekeepers.

Let any one provide such a hive as is described above, and test it by selecting two swarms, the queens of the same age, and as near alike as can be in regard to prolificness and the working qualities of the workers also equal. Let one of these be placed in the above described hive in the beginning of March; and if both swarms are small in numbers, the more marked will be the difference between them at the end of the month.

The idea that single hives promote breeding earlier in the season may be all right in theory, but it is not so in practice and reality; for a swarm that can cover five frames of brood in a single hive can cover ten in a double one, and it will only take seventy-two hours to prove it. Just take a swarm that you know has a prolific queen, and which can cover only five frames of brood in the spring or the fall; place it in a double hive and alternate a frame of brood with an empty one, and in three days every frame will be full of brood—especially if they

can have access to plenty of honey, or if one of my bee-feeders containing two pounds of water with four ounces of sugar dissolved in it, is placed over a hole in the top, so that the bees can have access to it. The bee-feeder is described in the July and September numbers of the BEE JOURNAL.

The double hive, moreover, more nearly approaches the natural home of the bee in the hollow of decayed trees, the walls of which are usually pretty thick and still further protected by the lining of decayed wood around the sides and top, absorbing the breath and moisture from the bees. The double hive, with holes in the top of inner hive, and with the space between the inner hive and the outside case filled with straw or other suitable material, accomplishes the same thing, only better.

A double hive ought always to be set so that the sun may shine on it all or nearly all day. Then the warmth will be pretty much equal, day and night, in the breeding apartment, encouraging the early and abundant production of brood. Whereas, in a single hive, the bees are alternately roasted by day and chilled during the night—driving them every night to a compact cluster to keep warm, and thereby retarding the production of brood.

The size of hives can only be determined by each beekeeper according to the honey pasturage of his section of country, and whether he collects his honey in surplus boxes, or uses the honey-emptying machine; and if the latter, whether he empties the combs once a week, or once in two weeks, or once a month, or only at the end of the season. Each of these circumstances will require a different size of hive; or by changing the frames, substituting empty ones for those that have been filled, the same result will be accomplished.

The shape, whatever advantage the shallow form possesses when surplus honey boxes are used—is of double importance now, since the introduction of the honey-emptying machine.

I cannot close without asking whether spiders are not the friends of the bee-keeper? If they are detrimental to bees, do they not, when taking possession of the space between the inner hive and the outer case, do the bees and the bee-keeper a compensating benefit by the destruction of the millers, worms, and other noxious insects? At least I have come to such conclusion from my observations this summer, and do not now trouble them in my hive, as I think the occasional appropriation of a few bees is more than counterbalanced by the good they do by destroying the millers that dodge the bee sentinels at the outer entrance of a double hive on chilly nights. The space between the inner hive and outer case forms a convenient trap for the moth, very few of which, under any circumstances, find their way into the breeding apartment.

The dead air space, between the hive and the outer case, retaining the heat acquired from the sun during the day, preserves its warmth throughout the night, and the bees are thereby enabled to keep a better guard over the entrance to the inner or breeding apartment. With the use of the shallow frames it is more economical

to use the two-story hive, both for space and cost, and to have the hive compact with the store frames above, where the bees are better able to protect them. The heat of the breeding apartment below ascending also evaporates the water from the newly-gathered honey.

Let bee-keepers, who have suffered from loss of bees in single hives in winter, have a case made and try one double hive this coming winter. It will almost pay for itself in the saving of honey through the fall and spring. Report the result of the experiment in the BEE JOURNAL, and let those who are troubled with the moth miller, try the above-mentioned method of cure, and report likewise.

I think the foregoing answers all the objections yet urged against Mr. Langstroth's hive. I discarded the single hive for its non-wintering and worm-cherishing qualities. I used the single standard hive. Neither it nor any other single hive is fit, I think, to put a swarm into, nine months in the year, in our cold and windy climate. But the Double Hive, made so that the frames will not go nearer than one inch of the bottom, nor within five-eighths or three-fourths of an inch of the top, with plenty of room between the ends of the frames and the hive, and with the other alterations I have suggested, will winter bees well on their summer stands in this climate if any will; and they will be entirely free from millers. In trying to make the hive which I invented overcome the above objections, I found out what would remove them in the Langstroth hive, and have correspondingly altered those I have on hand. The above is a full description of the alteration, and shows how it works.

JOHN M. PRICE.

BUFFALO GROVE, IOWA.

[For the American Bee Journal.]

Size and Shape of Hives.

On this subject there exists a great diversity of opinion among bee-keepers, but in view of all that I have yet read, heard, or seen, I have come to the conclusion that the cubic form is on the whole best adapted to the bees. To approximate most closely to this form, in combination with the most recent improvements, was therefore my steady endeavor in the construction of my hive—striving, however, to avoid running from one extreme to another, and preferring to aim at an attainable medium. This desired cubic form can, I conceive, be readily approached by the Langstroth hive, and I therefore made my hives fifteen inches square and twelve inches high; and in these hives my bees have always worked to great advantage. But, in my opinion, Italian bees need smaller hives than black bees, wherefore I have latterly made mine only twelve inches broad, calculated for eight frames. The combs in these hives are just as conveniently handled as those in hives only ten inches high; and I think that in high latitudes bees will winter better in such hives. Mr. Grimm, however, uses exclusively hives only ten inches high, and I cannot yet

state positively whether my bees have been more productive than his. I propose to try some ten inch hives next year, to ascertain the difference in my own apiary. There has thus far been no want of space for surplus honey boxes on my hives, for my bees have never yet been able to fill a single set arranged for twenty-eight pounds; though I expect to realize better results when I shall be able to provide myself with a sufficiency of empty combs to furnish a set of frames six inches high over the entire top. A colony of black bees which did not swarm yielded sixty pounds of honey in a second story, furnished with frames containing empty combs. An Italian colony produced a strong swarm, and yielded thirty pounds of honey in a super six inches high, filled with empty combs. Italian bees, however, are prone to fill up their hives with honey, thus unduly contracting the brooding space. The honey-emptying machine will enable us to regulate this matter advantageously.

Nevertheless, I conceive that in more southerly countries the ten inch high hive, "*the broad shallow things*," could be employed to most advantage; though it seems to me that in this region my twelve inch high hives are usually more populous than those of Mr. Grimm.

The fine fall pasturage which we have had here this year has placed bees in general in better condition for wintering than was the case in several previous years.

W. WOLFF.

JEFFERSON, WIS.

[For the American Bee Journal.]

Ligurian Bees and Size of Hives.

MR. EDITOR:—I see in the November number of the BEE JOURNAL, vol. IV, a correspondence from Mr. William Carr, of near Manchester, England, setting forth some of the points of superiority of the Ligurian over the common English or black bees. He instances a swarm sent away by him to Exeter in 1866 that gave off three swarms, the first of which sent one and the second two from a queen of the current year. So this one stock that year increased to seven. Now, to corroborate in part the credit of the Ligurian bee, I will say that in 1867 I set apart two hives of Ligurian bees to allow them to swarm naturally, (as I practice artificial swarming generally.) No. 1 swarmed June 3d, and gave off four swarms. Its first gave off *three*; its second *two* from a queen of the current year. No. 2 swarmed June 6th, and gave off *five* swarms. Its first and second swarms gave *one* each, one from a queen of the current year. Making in all fifteen swarms—one mingled with other bees and was not identified, thus increasing the two stocks to sixteen, all of which wintered. From hive No. 2 I took thirty-five pounds of surplus honey in the fall, and a considerable quantity from No. 1, of which no account was kept.

I am like some other Brother Jonathans, and do not like to be excelled by our cousins over the water. The above result was obtained

from the use of a shallow hive, ten inches high, fourteen wide, and eighteen inches long inside; both sides opening with double and treble wall, with intermediate air-chambers, securing uniform temperature through the extremes of weather. And, lo! it is a *patent hive*, patented by A. H. Hart, of Stockbridge, Wisconsin, in 1867, and known as the **EXCELSIOR HIVE**. If any of our bee-keeping brothers or sisters wishes to know more about the description and working of this hive, send postage stamp to the patentee and obtain his pamphlet and circular.

The above-mentioned extensive breeding leads me to conclude that the objections of friend Dadant against the Langstroth or shallow hive cannot be well founded, unless he can show that the square hives have excelled in some particulars. Forty years' experience has not taught me to believe that. As the brother says, on page 91 of the November number, that the habits of the queen are such that *she always commences in the centre of the comb*, and continues her laying *in regular circles*; if she comes in contact with the bottom or top of the frames she is thrown out of employ, and that this losing so much time constitutes his principal objection to the shallow hive. It seems to me from the view the brother has of the queen's habits, that a cylinder hive lying horizontally and filled with circular frames would come nearer his idea of a good breeding hive than any other.

I think there are quite a number of conditions requisite in a hive of bees to have brooding go on rapidly, which I shall not now enumerate. Practical bee-men understand them. One very essential quality I consider is a hive that will keep as near as possible a uniform temperature during the breeding season.

It hardly seems necessary for bee-men to differ about the exact height of a hive, as we have good results from both high and shallow. I am acquainted with a bee-keeper living within twenty miles of me, who has secured better results with the old box hive last season than any other in the circle of my acquaintance. He has taken about nine hundred pounds of surplus honey from about eighty swarms; while others with a hundred and more swarms, in improved hives, have not obtained half that amount. If I should not explain our doubting Thomases would say, "the old hive after all is as good as any." I was surprised to hear of his success this dry season, and went to visit him. I found that he had been benefitted by a very large amount of buckwheat sown around him. How his bees are off for winter stores I am not able to tell, but a very large percentage of swarms in this county this fall will be *minus* next spring.

A. H. HART.

STOCKBRIDGE, WIS.

Spiders seem hardly to deserve being ranked among the enemies of bees, because their webs are mostly too weak to entangle a bee.

Millepedes or wood lice are most destructive enemies of bees. They enter the hive during the cold of the winter and spring, eat the honey and destroy the combs.—*Wildmar*.

Bees and Blossoms.

Paragraphs like the following show that fruit-growers are beginning to be aware of the folly of denouncing the honey-bee as an enemy against which the stern resolves of annual town meetings are to be enlisted. Is it not about time for the good people of Wenham to reconsider their late decision, and not persist in the endeavor to hold the world to a retrograde movement? :

BEES.—A writer in the *American Journal of Horticulture* advocates the keeping of bees as a means of making fruit trees productive since they are great fertilizers of plants, carrying pollen, which in many instances without their aid would never become distributed. He says: "A relative of mine has for upwards of twenty years lived near the city and has all the time kept a great many bees. Since he has kept them the orchards in the vicinity have borne from two to three times the quantity of fruit that they did before; and some of the neighbors say that should he dispose of his swarms they would be obliged to keep bees themselves to obtain a paying yield of fruit." He thinks that those people who are about to banish bees from their neighborhoods, in the belief that they do injury to plants and trees, had better study up the subject before they take a step which sooner or later they must regret.

[For the American Bee Journal.]

E. Gallup on Wintering Bees.

MR. EDITOR:—As I have a great many inquiries in regard to wintering bees, I propose to give my answer through the *BEE JOURNAL*, and in that answer may criticise a trifle, but with no intention to stir up such a mess as I did by the shallow hives. By the way, I suppose that I ought to thank Mr. C. S. Payne for his article in the October number, and Mr. Chas. Dadant for his article in the November number. So here goes—"Thank you, gentlemen!"

To begin: Mr. Quinby recommends a barn cellar, and he gives a description of his in his book. Well, but we do not all have such cellars. Never mind, the principle is what we are after. Mr. Robert Jones, of Cedarville, Ills., in the September number, describes a very cheap house to winter bees in. Mr. H. Rosenstiel, of Lena, Ills., in the October number, gives us a description of another cheap house for the purpose. Mr. P. Lattner, of Lattner's, Dubuque county, Iowa, furnishes another. I think ten or twelve inches of sawdust would be rather better than six for our Northern climate. The bees would not feel the effects of the warm sun so soon, at least in the spring; and I am not sure that it would not be better further South. I think it would. Mr. H. M. Thomas, of Brooklyn, Canada, on page 224, vol. 3, gives us another cheap plan. His wire gauze is an actual injury, and his corn-cobs are unnecessary where the cellar is properly ventilated, and the requisite ventilation is cheaper than the cobs. Mr. B. S. Hoxie, of Cooksville, Wisconsin, in No. 11, vol. 3, describes another

house somewhat more costly, but nevertheless a good one for the purpose. A honey board with the proper ventilation is just as good as his straw mat; but as he uses the Kidder hive, he has the mats and of course uses them. Mr. J. C. Wedge, of Fon-du-lac city, Wisconsin, a practical and well posted apiarian, uses a house 14 feet by 20, with double board walls and a foot space between each filled with strawdust, with perfect satisfaction. Mr. Chas. Dadant, of Hamilton, Ills., gives us his method of burying bees, and, with his method of ventilating the trench, there is no doubt but it will work well. His method of ventilating is the true method of ventilating a wet cellar, or a cellar or cave dug into the side of a hill and covered with dirt. If you put one tube or pipe in the top it is no ventilation at all; or if you put two in, both of the same length, it amounts to just the same. But put one in and let it just come up through the covering of the roof and extend down to within an inch or two of the bottom of the cave or cellar; then put in another, letting it go down just through the covering, and extend five or six feet above the covering or roof, like a chimney, and you have the very best of ventilation without a strong current of air. The fresh air goes down through the lower tube, and the foul or heated air goes out through the upper one, slowly and surely, no matter from what point of the compass the wind blows.

I understand that Bidwell Bros., of St. Paul, Minnesota, practice burying their bees as soon as they are done gathering honey. Their method of burying I do not know. A common house cellar is an excellent place, but the most of them are kept too warm. If all those places mentioned above can be kept at an even temperature, just above the freezing point, with each swarm ventilated just right to suit the size of the swarm, they will answer well. A large swarm must be ventilated sufficient to keep them perfectly quiet. See vol. 3, page 192, for my method of ventilating. Then, in handling stocks in the fall and again in the spring, you cannot, without actual weighing, discover that the bees have consumed any honey whatever; but we cannot say that of any method of wintering on their summer stands. So the conclusion that we have come to is this, that the saving of honey, and the absolute certainty of wintering, pays all the trouble and expense incurred.

I am aware that some say that a cellar or cave dug into a bank, burying, &c., is bad policy. Of this class is a correspondent at Red Wing, Minnesota. Mr. T. B. Miner, in his *American Bee-keepers' Manual*, published in 1854, condemns the cellar for wintering bees. By the way, this man said, on page 175 of said book, "I think the reader will, on wading through these pages, when he comes to 'finis,' exclaim, 'enough, enough! I want no more.'" Well, if he is still alive, and stopped where he left off in that book, he knows precious little about bee-keeping. About thirty-five years ago I failed in wintering in the cellar, but the fault was not in the cellar, it was in not knowing how to do it. The conclusion is that if anybody fails, although the cellar may be quite damp, it is from want of the requisite knowledge.

Mr. J. H. Thomas, of Brooklin, Canada, in his *Canadian Bee-keepers' Guide*, on page 46, gives a description of his bee-house for wintering in. He says that a house five feet wide, ten feet long, and six feet high, is large enough to hold thirty of his hives, and allow a passage between, &c. His plan is to have double walls filled in with tan, sawdust, or fine straw. By the way, in my list of bee-books I galloped over his without any mention. The price is twenty-five cents. It is worth the money any time to any new beginner.

A strong large swarm, with abundance of honey and properly ventilated, will winter well on its summer stand; but it is almost impossible to give written instructions to new beginners that will winter every swarm, without as much trouble in fixing up as it will cost to fix some of the special repositories above-mentioned. Our winters are so variable that the same method that will work well in one winter would not answer the next on the summer stand. With an especial repository we have the winter under our control, and wintering reduced to an absolute certainty with proper ventilation. We must remember that a large number of swarms create a large amount of animal heat, and a small number create heat in proportion. So in ventilating we must take this into consideration and govern ourselves accordingly.

About that wire gauze. If you fasten in your bees with fine gauze and one bee takes a notion that he wants to go out, he commences butting his head against the wire, and very soon communicates his agitation to others of the swarm, and they lose some of their number every time. Now, instead of the gauze, ventilate each hive just right, and you will not lose a dozen bees per swarm in the whole winter. If you are troubled with or afraid of mice or rats, use coarse wire that a bee can pass through easily, and still keep out the mice. I winter in the cellar, and yet ventilate each swarm so that I can go all around with a light and not a bee stirs or attempts to come out. If a large swarm is not peaceable, give more ventilation. If from a small swarm some of the bees come out and discharge every time you go into the cellar with a light, the inference is that there is too much ventilation.

E. GALLUP.

OSAGE, IOWA.

[For the American Bee Journal.]

Color of Bees.

MR. EDITOR:—My experience with the Italian bees leads me to the belief that the color of the black bees is transmitted to the Italian race by them as nurses. I am so confident of the fact that I am willing to sacrifice my reputation as a bee-keeper that it is so.

LOCKPORT, N. Y.

J. L. CULVER.

Many people have so strong a dread of bees that no assurance of safety can prevail on them to act familiarly with these insects. Indeed there seems to be a hidden quality in some men which renders them disagreeable to the bees.—*Wild-mar.*

[For the American Bee Journal.]

Sending Queens by Mail.

MR. EDITOR :—The question of the best way to send queens to distant places has for a few years attracted much attention. We can box a common bee hive with a space of an inch or an inch and a half between the hive and the box, having covered the bottom and openings, and the top holes or other ventilators of the hive, or those we make on purpose for free ventilation, with wire cloth, and send it in cool weather all over the world—certainly from Italy and Egypt to America. Then the hive is, say fifteen inches square—a large hive—with ample ventilation through its wire cloth, in a box eighteen or twenty inches square, full of round holes, also covered with wire cloth, and experience is ample that little difficulty is had in removals of many thousands of miles.

But in sending queens there come these requisites: 1st. *The queen* above all things safe; 2d. Workers enough to take care of her and keep her warm. Under these requirements such bee men as Langstroth began with quite a large box, which they soon reduced to one whose inside diameter were about $2\frac{3}{4}$ of an inch wide, about 5 inches deep, and 6 inches long. This again became reduced to $1\frac{1}{2}$ inches wide, 3 inches deep, and 4 inches long. In each size, the approximations to which I have named, two movable comb-frames with capped honey, were made fast, or one, as the case might be, and a suitable quantity of bees put on the comb, or combs, with a queen.

At last I received by express a box with one movable comb three inches long and one inch wide, a queen and forty workers, all the cells filled with honey except half a dozen, and the cells sealed over, and only *carpet tacks* to hold the comb in place. I wrote back that the queen was probably chilled on the cold honey, and complained of the insecurity of the comb-frame fastening. Yet the queen came safely fourteen hundred miles, and with such an excess of honey that I had a taste of almost Rocky Mountain honey.

Thus you see I was prepared for the next step, which was—can a queen be sent safely by mail? Experience had shown that all these express company packages were too large, that the queen often laid the blank cells on the way full of eggs. Here all the workers had accepted their situation in the rattling cars, and had done the best they could to repair damages, and nurse their queen and themselves up to a fair trim again, at the earliest moment.

At this point several mail boxes were proposed, and only deserve attention. One is a box made of thin lumber, so as to have an internal diameter of about $1\frac{1}{2}$ inch, and is square. Ventilation is given by saw cuts in the sides and ends about an inch long and a sixteenth of an inch wide. This, as I understand it, was to be sent only a few miles. So the bees were fed all they would eat, and sent by mail.

Among others came a very peculiar bee-box, made by H. Alley, Esq., of Wenham, Essex county, Mass. This is such a neat affair that I

figure it for the BEE JOURNAL. The first thing is a piece of pine wood about two inches long and $\frac{3}{4}$ of an inch wide and broad. In this cut out a trough-like excavation as that shown in section in fig. 1, in which the space by the inside lines is the trough-like excavation cut in it.

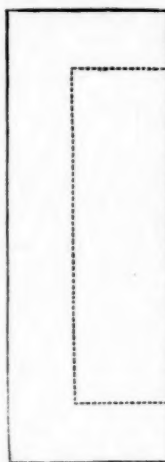


FIG. 1.



FIG. 2.

Fig. 2 shows its use, and is a view at right angles to fig. 1. By this figure it will be seen that the trough in fig. 1 is filled with a piece of sponge saturated with honey, and a piece of wire cloth is nailed over the sponge to keep it in place. This sponge feeds the bees while in the mail-bag. To complete the box three pieces of wood are made: a quarter of an inch thick and about two inches long. There are two of these nailed to the piece made as in the figures, and the other on the end of the other two thin pieces—thus making part of a box in front of the sponge. A piece of wire cloth makes the top and bottom of the box. Thus, in the boxed space in front of the sponge, with top and bottom of wire cloth, is a place for a queen and a hundred or two of workers; and the sponge has feed enough for fifteen or twenty days.

Such a box I received last summer from Mr. Alley, with an Italian queen and about fifty workers, safely; and giving her to a powerful artificial swarm she has done well.

Now let me say that I have no doubt that this queen would have gone safely to the Rocky Mountains or to Texas by mail. That is, the package was good for any distance reached in ten days by mail, in any time from June 10th to October 10th.

The box was inclosed loosely in paper with my name on it, and came from Wenham, Mass., near Boston, to me, 450 miles or more, for two cents postage, under the law for the diffusion of seeds and other agricultural products. The Italian stock of Mr. Alley being so pure I was greatly pleased, Mr. Editor, and now tell you and your readers the result.

My bees have done well this season. I am yet skeptical as to the general success of the Italian bee. I hope more from the northern China bee and the bee of "All the Russias," or the Russian bee, enduring the excessive cold of that Empire as it does. But that is too large a question to discuss now.

S. J. PARKER, M. D.
ITHACA, N. Y., Nov. 14, 1868.

[For the American Bee Journal.]

Various Items,

Will Mr. Gallup please tell us how many frames of comb his bees made, with the size of frames, as I am also just commencing in bee-keeping, this being my third season? He says he had thirteen stocks, and increased to thirty-five. My object was also an increase of stocks, and I would like to compare results.

I commenced with ten stocks, one being queenless in April, and failing to raise a queen all summer until September. I had at one time fifty swarms, besides losing ten or more that left for the woods. All had fertile queens. I will here remark that every swarm raised its own queen, with three or four exceptions, and that forty of the young queens, more or less, were from five to seven weeks old before I found eggs or other evidence that a fertile queen had been raised. Also, that my bees, early in the spring as well as during the honey harvest, and later during the drought, started and raised only one queen at a time, with the following exceptions, viz: One stock started *thirteen*; two started *five*; two started *three*, and five started *two*. My old stocks also—those from which I had taken four or five frames of brood weekly to make new swarms with, and to furnish brood to such as failed to raise queens at first trial, (and they were not a few,) and likewise to supply all young swarms till their own queens began to lay—would have swarmed naturally if I had allowed them to do so.

I made new swarms as long as I had combs to furnish them with. Then I kept up the young swarms as long as there was honey in any of their hives. It was a hard struggle for either young or old stocks during August and September to keep house. They seemed to depend for their daily supply on an acre of buckwheat, sown about the first of June. It looked a good deal as if I had overdone the thing. I started to make ten from one as I did the year before. Acting on the adage "nothing venture, nothing have," I would not give up as long as there was a chance of success to bring me out all right. On the 20th of July I planted an acre of borage, but August and September were so cold that it failed to bloom, and with it failed my last hope.

The season being over, the following is the result: An increase from nine stocks to twenty-eight, with an abundance to winter, but no surplus to take away; and an increase of one hundred and sixty frames of comb, each one foot square—an increase of 16½ frames for each old stock. Besides this, I transferred sixty frames

of comb which they had to mend, patch, and join to the frames. Last year I had an increase of forty-five frames from the old stocks wintered. I have not the least doubt that if I had let those hives that furnished the bees for my new swarms, furnish the brood, and let the others furnish the bees, the result would have been a great deal better. It will be seen from the above that, if the result is not up to expectation, it is still satisfactory.

I will also state the following observations of my hives: The double ones, facing south and in the sun all day, did the best. The double hives facing north, and the single hives facing south, and set so that the sun shone on them all day long, did next best. Double hives in the shade, facing north or south, amounted to little or nothing. And with regard to the time of flight of bees, from single hives or double, there was not much difference between those facing the same way. As regards the amount of bees that can be taken from a hive, I will only say that I generally moved a swarm once a week; but one swarm I moved twenty times in three months, and it gave bees enough to cover from four to six frames most of the time. In that case I would divide the young one in the course of eight or ten days.

Referring now to the article "*Criticism*," on page 188 of the April number of the BEE JOURNAL, "How to make all swarms equally prosperous," I would ask, can it be done? Can a man breed his cattle so that his cows will all give even quarts of milk or the same number of pounds of butter, or all weigh even pounds in the scales? I think not. He may, with twenty or more swarms greatly increase their average yield; but there will still be a marked difference between the individual hives, as there would be between the product of his cows. I think the nearest to such a desirable result that can be reached will be by judicious feeding and stimulating during the spring to get strong stocks early; and during August, or a dry period, to have strong stocks on hand for fall pasturage. This, and keeping the queens of about an age, and the removal of unprolific queens, is all that can be hoped for.

WINTERING BEES ON THEIR SUMMER STANDS.

Mr. J. T. Langstroth says:—"Experience teaches that there will not be found wanting those who are ready to make indiscriminate attacks upon anything and everything which has our name connected with it—but those who will "prove all things, and hold fast to that which is good." In reference to his mode of wintering, would it not be better to take off the legs; cut off the portico, leaving it just two inches deep; nail a half inch strip all around the bottom "under;" then place the hive in the large outer case of his glass observing hive, altering the entrance to suit; knock off the cover, and nail a rim or frame so that the cover will fit the case like the cover of a pasteboard box—making it convenient to pack the carpet and rags around the front, back, and sides, and on the top? It being already protected by three inch bottoms with two dead-air spaces, it needs no further protection there. How much more

than the way he recommends will this cost? But how much better and handier; and how much easier to pack and unpack; how much neater in appearance; and how in every way more desirable. I speak from experience, having one made and in use these three months for winter. He also says, "Now right the hive, put strips on the rabbets so as to raise the frames about half an inch higher from the bottom board." Now, having done this, why not nail them there, and keep the frames in that position evermore; reducing its chance of becoming infested with worms three-fourths; and while you are about it, just nail an inch strip all around the top of the hive, raising the honey board also—reducing the chances of its being infested with moth-worms three-fourths of the one fourth left, thus making it almost moth proof? Last spring I altered mine so, and have not had a worm in them since.

With regard to the packing with rags, I will say that in my experiments made with the hive I invented (see page 86, vol. 4, of the BEE JOURNAL) the packing was first a layer of cotton batting, then a coffee-bag about three-fourths full of woolen rags, leaving the rags loose so that they would readily fill in the corners. I transferred the bees at night when the mercury was below zero. Next morning they had fastened the combs and patched them up all right on top, and in twenty-four hours there was brood in three combs. This was in February, and there was no brood in the others for five weeks after. I thought so well of the rags that I bought 500 to 600 pounds last summer for this winter's use. So you see I am all right on the rag question, and a little ahead of time.

A GOOD BEE-BREEDER.

Mr. Charles Dadant, on page 91 of the BEE JOURNAL, and other correspondents through the back numbers, find fault with Mr. Langstroth's shallow hive, on account of the queens not being able to swing around a circle, thereby making it a poor bee-breeding hive. Gentlemen, please turn to page 87 of vol. 4. There you will find a hive described that is warm enough to breed your bees, and a frame as compact as possible, hanging in the best shape for breeding, and for storing honey above the brood, with room for plenty of honey in the spring in ordinary seasons. A circle of ten inches in diameter or thirty inches in circumference can be had, with practically no bottom to the comb below the cluster of bees for millers to lay their eggs in. Moreover, bees storing honey on their return home, do not have to pass over the brood to reach the top of the frame. They alight at the entrance (7), run up the inclined back (3) of the inner hive until they reach the strips (4), up which they run until they reach the level of the cells they are depositing honey in.

ALL WORKER COMB.

In running my bees from one to ten this last season, in over two hundred frames of comb made, not one was drone comb, neither was the comb made in hives without a queen, or where the bees were raising one, nor whether they had a fertile or an infertile queen, drone-celled.

They commenced none; and I have had no trouble from that source.

BEE-FEEDING.

In reply to Mr. Gallup's general rejoinder, I will only say that it matters little how he may feed his bees, since by his own confession he does feed. He may feed them spoon victuals or honey by the frame full from other hives. That is his method and his privilege. But, all jokes aside, are bee-keepers to rob their bees in the fall of most of their stores and combs, and then, if the spring is backward, or a season like the last occurs, ought he be either dissatisfied, or allege that bee-keeping does not pay, if he has to feed them a little to help them through? Ask the farmers if manure does not pay; ask the butter maker if feed does not pay; ask the cheese-maker if corn does not pay to feed cows? If your store hogs were not fed, how much pork would they make? How much wool would you get from your sheep without feed? And so on to the end of all things or animals appropriated by man to his own use. Even his machines he has to feed with "oil," or they will not run; and the most successful farmer, stock raiser and machinist, is he who feeds judiciously. And, in time, I think the most successful bee-keeper will be included among the most judicious of feeders.

THE HIVE FOR NATURAL CLUSTERS

of bees in winter is the one described on page 86 of vol. 4 of the BEE JOURNAL. The frame, as hung, is eighteen inches high and eighteen inches wide, thus allowing large or small swarms to cluster entirely according to their instincts or nature. In this respect it is equal to any, if not superior to all, for wintering bees on their summer stands.

THE HIVE FOR NEW BEGINNERS

is the one described on the same page of the said volume of the BEE JOURNAL. It is a hive that can be recommended to bee-keepers generally as one which, from its form, must always be clean, having no bottom for pieces of wax or dirt to lodge on, which in most cases will be found to be the true cause of trouble with bees. There being no bottom, only inclined sides and top, if no more combs are left in the hive than the bees can cover, all will be well; and in the morning or at eve by simply removing No. 6 during the spring, summer, and fall, and No. 6 and No. 10 in the winter, the condition of the colony can be pretty correctly told at a glance.

J. M. PRICE.

BUFFALO GROVE, IOWA.

The queen bee begins to lay her eggs as soon as the severity of the winter's frost is past; and proceeds in proportion to the mildness of the season. The number of young bees that may by this means rise in the hive may endanger the lives of all by famine. On this account the owner should at this season carefully and frequently examine the state of his colonies, and supply with food such as are likely to be in want. He may thus save colonies that would otherwise be sure to perish.—*Wildmar.*

[For the American Bee Journal.]

Multiplication of Stocks.

In the BEE JOURNAL, vol. 3, No. 9, page 180, you will find the following questions:—To "what extent can one stock of bees be increased artificially, in six months, with care and feed sufficient? And what quantity of sugar will be required for the same? The figures are wanted to see that it will *pay*." See also the same question, vol. 2, page 165.

Now, gentlemen, I have been waiting with all the patience imaginable for some of the knowing ones to answer this question. But, as they do not, suppose you stand back and let Gallup try his hand. In the first place, we will see what stories are told about natural swarming. See vol. 2, No. 10, page 190, for an instance of an increase of thirty in one season, and another of twenty-two, besides several lost for want of hives to put them in. See also same volume, page 195, a notice by J. L. Davis of ten swarms from one in one season. Mr. Wellhuysen (see July number, 1868, for description of hives used) informed me, (and I have no reason to doubt it,) that he had increased one colony up to thirteen; and the following season he had increased those up to one hundred and twenty-five by artificial swarming; and, as I informed the readers of the JOURNAL, I learned some things from him. There are but few hives that are calculated for such great increase. The Wellhuysen hive was one. The form of hive which I use, and Mr. J. M. Price's hive, are admirably adapted to the purpose. In the American form, and the broad, shallow form of the Langstroth, and several others, it would be useless to attempt such an increase. The form I use, and the division board, &c., have already been explained.

We will say that we have one good swarm to start with in the spring, with the comb all right, and a prolific queen raised the season previous, with not too much honey, and not too much old pollen. We will in this climate commence stimulating about the first of March. We want a small quantity of drone comb in the centre of the hive. (Four inches square is sufficient). In three weeks we will have every particle of comb filled with brood, and the old honey all used up. Now, if you please, we will take out one comb filled with mature brood, about three quarts of bees, with the old queen, and start a new swarm. The evening before taking out these, we will give them all the sweet they can contain. Now, when we take them out they will stay where we put them, by doing as I told you in the article "How to make natural swarms artificially," in the July number of the BEE JOURNAL. Give the bees one empty frame and adjust the division board. The young bees hatching out of the full comb, give the queen a chance to deposit her eggs. Now feed the old and the new swarm. The new one must have all they can consume, for they have comb to build. The old swarm wants just as much as they can consume without storing. After the new swarm has filled the empty frame with comb, slacken your feeding until the queen

has all or nearly all the cells filled with brood. Then insert another empty frame between the two full ones, and increase the feed again.

Now we have got to look after our queen cells, and we want about eight. Take out seven, and seven frames with bees are enough to occupy said frames. Insert these frames in seven hives, adjust your division boards in each, and make your division of bees. The evening before this division, give the bees a good strong feeding, and adjust the division board in the old swarm. (We use twelve frames in one hive.) Now, we have four frames left in the old hive, and may want two of these by and by to give to the old queen, to prevent the bees from building drone comb, or the old queen may not breed fast enough to suit us. In that case we will want another comb and queen cell to supersede her.

As soon as your young queens commence laying, you have to build their stocks up in the same manner you did the first one. With one full frame and bees enough to occupy that frame, there is no danger of the bees deserting, if the supply of honey is kept up regularly; and with Mrs. Tupper's process of fertilization there is no danger of losing the queen. In all cases we must have the comb well crowded with bees, whether there is one comb or ten; and all upward escape of animal heat must be prevented.

Now we have nine swarms of bees, and must keep them equalised and build them up as fast as possible. Recollect that one frame filled with comb, having a prolific queen and bees to occupy the frame, in the right kind of hive, is just as capable of protecting itself from moths and robbers as any full sized swarm. For, so far as it goes, it is a strong swarm to all intents and purposes. And four frames filled with bees, comb, and honey, will winter just as well as the best of swarms, in a cellar or proper repository, if properly ventilated. In this manner I have wintered spare queens, and if I did not need them for queenless stocks, I built them up to a full sized swarm in the following season. Now after all those nine swarms are built up, we will have that with the old queen in filled first, and we want that frame with the drone comb in, in the hive with the old queen, because if we want more swarms we must have more drones and queens.

We can now go through the same process we did at the start with the old queen, only it is later in the season, and we want more bees with her this time. Nor must we start over four new swarms at a time, as we have nine swarms to strengthen up and equalise. This we can work very safely; and if we are sure of a supply of honey in September, we can keep on making swarms until into that month. But to move perfectly safe, we must make only one or two at a time towards the last.

Now comes the question about the quantity of sugar. I have seen seasons that to make thirteen swarms from one would not require over three dollars' worth of sugar; but from one to two dollars per swarm is enough in almost any season—for should the honey crop be cut off, as it was this season, your increase must be stopped at once, unless you want to feed for

winter. Remember that at any time when bees can gather sufficient they do not want feeding; and in some seasons or at some times they only want enough to make up the deficiency, which may be only a trifle. They should not be fed so much as to restrict the queen from laying; and when you want a comb built they must have abundance of food, either naturally or artificially, and the fertility of the queen must be kept up to her full capacity at all times.

The next question is, will it *pay*? With Italian swarms at from fifteen to twenty dollars each, *where is that everlasting Yankee?* He can certainly be taught to make them cheaper than to buy them. Now I can answer another question, and here it is: Had I better buy a stock of four or five hundred dollars' worth of bees to commence with? *No!* If you have not the knowledge and skill, buy only one or two swarms and make the rest; and by the time you have made them you will know how to take care of them. Your knowledge will increase as your bees increase.

The reader will probably ask—"Are you sure of getting eight or nine queen cells in the way you speak of?" Yes, pretty sure, if you have a prolific queen and the supply of food is kept up just right, either naturally or artificially. I have hardly ever failed of getting from eight to twenty-six in a strong swarm with all worker comb. To feed for comb-building you should use white crushed or coffee sugar; and it is my impression the food should be about the consistence of thinnish honey. To promote breeding it should be thinner. We often hear the remark, "My bees were apparently doing well; they were strong and numerous, and I was expecting them to swarm; but they killed their drones and did not swarm." This could have been prevented by judicious feeding at the right time. If increase is what we want, we can create a swarming mania any season, by keeping up the supply of food artificially when the natural supply fails. In fact a queen can be kept breeding even in mid-winter by stimulation and keeping the swarm in the right condition. As I said on a former occasion, in all cases keep the queen in advance of the bees if you expect to profit from them. I have had three cases in my experience where from some cause the queen did not commence breeding as early as she should have in the spring, and the bees filled every cell with honey, so that she had no room to breed. In those cases I removed some of their central combs and compelled the bees to build new. This gave a chance for the queen to lay, and they afterwards became good stocks.

There are a great many old and experienced bee-keepers who have said, and will say, that such an increase as Gallup speaks of is impossible. Hold on, gentlemen, be not too fast! Let Gallup ask a question: Do you suppose that Gallup, with an improved Langstroth moveable comb hive, is going to be beat by his old friend Wellhuysen with his cow manure immovable comb hive? Not if he can help it, and he thinks he can. I do not wish to be understood as recommending an attempt at any such increase by a mere new beginner. But what I have learned to do I can teach others to do. And every bee-

keeper should thoroughly understand the theory; and then he can practice it or not as he pleases. Let me here remark that I studied long and closely (after practicing with the Wellhuysen hive) on the subject of getting up a movable come hive small at the top, similar to Mr. Bingham's or Mr. Price's; but after using the hive I now use it worked so near like what I wanted it to do, in respect to cheapness, simplicity, ease of handling, and for artificial swarming, &c., that I gave up making the one I had already devised in my head.

Now, friend Monroe, you will probably say that Gallup has not exactly told the number of increase, nor the exact amount of sugar required. Well, we will leave that for our friend Quinby to tell. And we have as strong suspicions as he has of us, that it will bother him to tell within a quarter of a swarm or one ounce of sugar.

ELISHA GALLUP.

OSAGE, IOWA.

[For the American Bee Journal.]

The Honey-Emptying Machine.

The honey-emptying machine must, I think, gradually facilitate the production of honey, and may be regarded as a decided improvement if there are not two *ifs* in the way. *If* first, the honey will sell in market as well in the liquid form as in the comb; and secondly, *if* the so frequent depriving the bees of their stores, and brushing them from the comb, does not so enrage them as to render them too angry and contentious to endure. I find my Italians, in the height of the honey season, very belligerent and not disposed so allow a single frame to be taken from their stores without vigorous protest and defence. Now, how will they endure the frequent pilfering of their stores, and the brushing of them from the comb? Will not their disposition be increasingly exasperated? Will those who have had experience give us light on these points?

BOLTON, MASS.

P. R. RUSSELL.

Bees and Honey in Minnesota.

RICH VALLEY, (MINN.) Nov. 23, 1868.

The past season was rather a poor one for bees in this State. Nevertheless, judging from my own experience, in a poor location (the surrounding country being prairie, almost entirely cultivated in grain) bees, when properly managed, paid a larger profit on the capital invested than any other farm stock.

The honey gathered was superior in quality to any that I ever saw before. Of six colonies that I transferred from box hives to frames in the spring, each gave one good swarm and from thirty to forty pounds of surplus honey; and this without the aid of any empty combs, or honey-emptying machine. Doubtless if I had such aids, they would have done still better.

I do not intend to be without the BEE JOURNAL as long as I can get it, and only wish it came oftener.

L. M. LINDLEY.

[For the American Bee Journal.]

Facts.

In the November number of the JOURNAL it was editorially stated that the "Kidder Hive" had been declared an infringement on L. L. Langstroth's Patent, in a suit in the United States Court, for the Northern District of New York. In the December number, page 117, I am surprised to see that the editor finds he was under a wrong impression when he made that statement. It also appears that friend Gallup, to use his own term, was a "putty head" in thinking the editor was right, although he must have other sources of information, as he quotes names, dates, and locality in regard to the decision which the December number informs us was never rendered. Had this information reached me "in time," I "should have made the necessary correction" of the statements in the November number, as I think no cause is ever benefitted by any, even innocent misstatements of facts. But, I was under the same impression with Mr. Gallup, and, as the December JOURNAL upsets my previous notions on this subject, I am moved to ask the publication of the following:

U. S. CIRCUIT COURT,
NORTHERN DISTRICT NEW YORK. } *In Equity.*
ROSWELL C. OTIS vs. CHARLES AUSTIN.

This writ having been duly brought to a final hearing upon pleadings and proofs, it is found and hereby ordered, adjudged, and decreed by the court, that the re-issued "Letters patent" on which this suit is brought, for improvements in bee-hives, issued by the United States to Lorenzo L. Langstroth, dated the 26th day of May 1863, is a good and valid patent, and that said Langstroth was the first and original inventor of the improvements secured by said re-issued patent; and that said complainant, Roswell C. Otis is the owner of said patent, and among other places in and for the county of Wyoming, in the State of New York; and that the defendant Charles Austin, has infringed upon said patent, and upon the rights of the Complainant under and by virtue of the same, in that said defendant has used movable comb frames of bee-hives, constructed and adjusted in such manner that when placed in a hive or case the sides and bottoms of the frames are kept at suitable distance from each other and from the case, and are separated from each other at their tops, substantially as specified in the first claim of the re-issued patent granted by the United States to Lorenzo L. Langstroth dated the 26th of May, 1863, and that said defendant has used movable comb frames constructed and adjusted in such manner that when they are inserted in the hive the distances between them may be regulated at will substantially the same as specified in the second claim of said patent.

It is further ordered, adjudged and decreed that the complainant do recover of said defendant the profits, gains and advantages which said defendant has received, or which have accrued to him from the use of bee-hives containing said improvements.

It is further ordered, adjudged and decreed that said complainant recover of said defendant his costs, charges and disbursements to this suit, to be taxed.

It is further ordered, adjudged and decreed that it be referred to one of the masters of this court to ascertain, and take and state and report to the court an account of the gains, advantages and profits which said defendant has received, or which have arisen or accrued to him from infringing such patent by the use of the improvements specified in the first and second claims of said patent.

It is further ordered, adjudged and decreed that the complainant, on such accounting, have the right to cause an examination of said defendant; and also the production of his books, vouchers and documents, and that he attend for such purposes before said master, from time to time, as said master shall direct.

It is further ordered, adjudged and decreed that a perpetual injunction be issued in this suit against the defendant, restraining from further infringement of said patent to, and in accordance with the prayer of the bill of complaint in suit.

WM. D. SHIPMAN, Judge.

Dated UTICA, March 21st, 1866.

(A true copy.)

Witness my hand and seal of said Circuit Court at Utica, this 21st day of March, A. D., 1866.

AUG. A. BOYCE, Clerk.

Now, it seems to me that this is a "decision" within the ordinary interpretation of that word, although the language is "ordered, adjudged and decreed." Being an interested party, however, I will leave it to Gallup, who, as far as I know, has no interest in either patent. It only remains to ascertain what kind of a hive Charles Austin used, which was decreed to be an infringement on the Langstroth Patent. To do this let us see what another interested party says, in a flaming circular, headed \$500 reward. I quote from said circular:

"Mr. Otis commenced a suit, in the Northern District of New York, against Mr. Charles Austin, of Wyoming county, N. Y., *having my hive in use. This suit I am now defending.* * * * And, furthermore, no person buying *individual or territorial rights* is obliged to pay *one cent for any claim* or devise their [Langstroth and assigns. J. T. L.] Patent covers,—as I am prepared to show, if they will let this suit come to a trial; *this will show* which of the parties is best entitled to the use of a movable comb hive. * * * *

(Signed,) H. P. KIDDER,

BURLINGTON, VT.

June 20, 1865.

The *italics* in the first two sentences quoted are mine; the rest are his own.

It seems to me that Gallup and myself were excusable; he in his statement, and I in my neglect to contradict the November JOURNAL's editorial statement. If not, please let the public have the benefit of the information now in possession of the editor.

J. T. LANGSTROTH.

OXFORD, BUTLER CO., OHIO, Dec. 3, 1858.

[For the American Bee Journal.]

Italian Bees and Red Clover.

MR. EDITOR:—Having read, with great pleasure and profit, the BEE JOURNAL, for the last two years, and also the first volume in 1861, I will give you a report of my bees for the benefit of your readers, and because I am very much interested in the success of apian science.

I sent to Mr. Quinby, or rather went to see him at St. Johnsville two years ago, and purchased one full-blood Italian stock and several nice queens to introduce to my native stock. I introduced them successfully in July and August—living then in the suburbs of the city of Syracuse, N. Y. In the month of September and October I had five or six stocks of Italians. I was particularly pleased with their disposition. They allowed me to take out the frames of brood and bees repeatedly in warm and even in hot weather without smoke, though I invariably use the fumigating pipe for all natives. I had some transferring to do in the robbing season, and proved to my satisfaction that they did not attempt to rob so much as the natives, and still they improved their time well in the field.

But my especial test came in 1867. I kept four swarms of Italians and sixteen swarms of natives in the country. I transferred all my bees into frame hives in May. In June I found my mild Italians of the preceding year were up and dressed for business, working for dear life in the fields. When I went to their hives for comb and brood for rearing young queens I found the fumigating pipe of great advantage. They would meet me half way unless I did business in a scientific way. I found the Italians always ready to resist robbers. It was really amusing to see them catch the honey-hunters and dress them out on the alighting board.

I took three sets of combs and brood from each of my Italian stocks for building up new stocks during the month of July and August. In August the buckwheat and seed crop of red clover were very plenty in this vicinity. I had read all the statements and arguments, *pro* and *con*, in the *Country Gentleman*, the *American Agriculturist*, and the *AMERICAN BEE JOURNAL*, alleging that the Italian bees would work on red clover, and that they would not. I took three or four cards of honey and brood comb from each of my Italian stocks, shaking and winging off the bees into their hives, building up new stock with the brood; and served several of my native stocks in the same way in August while the buckwheat and seed crop of red clover were in blossom. No white clover was then in bloom. On the 10th of September I found the Italians had refilled their hives with white honey and comb, and each a set of boxes with white honey. The natives had all stored red buckwheat honey—which is rather unsaleable in first class market. I called my neighbors' attention and observation to the facts—they being previously very sceptical of the ability of the Italians to get honey where the native could not; but finally acknowledged the great point of superiority.

My Italian stocks have yielded me a profit of

from \$75 to \$100 each last summer, in increase and surplus honey. Last spring I was offered fifty dollars each for two hives of Italians, but did not accept it, as I was bound to give them a fair trial myself. I have increased my stock and Italianized my natives on Mr. Quinby's plan the past season, so that my bees are now worth \$1,000. They are all in good condition in winter quarters, in a dry, dark cellar, with the covers off and the honey-boards removed from the hives and plenty of upward ventilation.

I sold a few Italian stocks last fall to neighbors at \$25 each. I purchased twenty swarms of full-blood Italians from Mr. House, of Oneida, in January, to stock another yard. They are very nicely marked; bred from Mr. Quinby's stock. I like the natives very much; but appreciate the Italians for the white honey they yield, and their uniform business qualities.

H. WELLINGTON.

SYRACUSE, N. Y.

[For the American Bee Journal.]

On page 107 of the present volume of your JOURNAL, E. Gallup makes assertions to which I desire to call the attention of your readers, and challenge him to prove as *true*. He alleges that Flanders has been selling impure "one-striped queens" to bee-keepers in the West, as pure, &c. That I deny, and hereby demand the proof, as the above is an *infamous falsehood*. The queens sold by W. A. Flanders & Co., have been carefully bred and warranted to give perfect satisfaction, and, as far as we know, our patrons have been pleased with them. They have been sold to popular breeders as "queen mothers," and we have their letters which show the very high estimation they put upon our stock. We can give scores of such references, if necessary. Our business has increased to such an extent the past season, that we have had no occasion to resort to the common practice of advertising in the papers, in order to sell all the queens we have been able to grow for the market. At present our terms are as *high* as market rates. We would inform all interested parties that, in *body* and *business* "we still live," and enjoy a very comfortable degree of health; and that the present weight of one of the firm (Flanders) by Fairbank's standard scales, is just 257½ pounds avoirdupois. If we had belonged to the medical profession and put M. D. to our name, it is probable Mr. Gallup would have interpreted it Mule Driver. "Where ignorance is bliss, 'tis folly to be wise." We take the BEE JOURNAL and can recommend it as "*good to take*," having taken it from the beginning, and shall continue to do so as long as it has for its object the promotion of truth and light in bee-culture. W. A. FLANDERS.

SHELBY, OHIO, Dec. 9, 1868.

Chamber's Encyclopedia states that the *Apis unicolor*—the species of honey bee found native in Madagascar and the Isle of France—yield an esteemed honey of a *green* color.

Hives should not be placed where the water from the eaves of houses, or from trees or hedges, may drop on them.—*Wildmar*.

THE AMERICAN BEE JOURNAL.

WASHINGTON, JANUARY, 1869.

THE AMERICAN BEE JOURNAL is now published monthly, in the City of Washington, (D. C.,) at \$2 per annum in advance. All communications should be addressed to the Editor, at that place.

A Re-Correction!

We refer our readers, and particularly those immediately interested, to an article in this number of the JOURNAL, under the caption of "Facts," respecting the decision of the Circuit Court for the Northern District of New York, in the case of OTIS *vs.* AUSTIN, in which it was "adjudged and decreed" that the Kidder hive is an infringement of the Langstroth patent. It thus appears that the "correction," made in our last issue, of an editorial article in the November number, was itself a mistake; and that our previous impression of the matter was not "erroneous." In justice to all parties we may state, that our information was derived from a gentlemen in no wise interested, *pro* or *con*, who acted at our instance and solely with a view to oblige us; but whose examination of the records, it seems, did not extend sufficiently far to reach the final action of the Court in the premises—though he supposed he had got to that point; and under the circumstances, almost any one might have been so misled.

In an address before the Silesian General Apiarian Association, at Breslau, Mr. Kunze cautions bee-keepers against emptying quite recently stored honey by means of the machine, but does not state why it should not be done. Other speakers said it could be done with advantage, while the editor of "*Honigbiene*" remarks that late observations communicated to him appear to show that such seemingly *unripe* honey "will not keep well." A worthy old lady told us, several years ago, that in her family of seven children "preserves and honey never keep well!" Perhaps the adverse observations communicated to the editor were based on similar experience. Certainly the results of the experiments mentioned by NOVICE in the BEE JOURNAL for December, 1868, show no necessity for delay in emptying the combs. No doubt this matter will be fully tested next season.

We have received Part IV of the "GUIDE TO THE STUDY OF INSECTS," which, like its precursors, is filled with interesting and instructive matter, richly illustrated. Part III contained accounts of the hymenoptera (bees, wasps, &c.) and three full page illustrations and numerous wood-cuts. Part V will likewise contain two full page illustrations, with many wood-cuts in the text, and if it can be prepared in time, a steel-plate illustrating the transformations of moths, mostly not before figured. In the pages of this serial the structure and habits of the honey-bee, clothes-moth, wheat-midge, hessian-fly, weevil, grass-hopper, house-fly, dragon-fly, &c., &c., are figured and described in popular language, so that all who choose may acquire a full knowledge of our common insects, whether beneficial or injurious.

Another Honey Plant.

A short time ago Dr. Devron, of New Orleans, sent us some dried specimens of a "new black bee plant," which Prof. Porter, of La Fayette College, Pa., identified as *Lythrum alatum*, Pursh, "a native of the United States, growing west and south." It is a species of Loosestrife which we have nowhere seen enumerated among honey-yielding plants. Dr. Devron writes, "it is a native perennial plant, which I have allowed to grow in my garden for the last two years, though very common in our vacant lots and fields. It is a honey-plant—for bees cover it from morn to night, carrying from it no pollen. A strange peculiarity about it is, that it is visited by almost all the honey loving insects, even to the house-fly, but *never by an Italian bee or a hybrid of the same*, though growing in front of hives containing this variety of the bee."

It is well-known that the Italian bee visits many plants and flowers not frequented by the common bee; and it was supposed to be, in that respect, peculiarly privileged, as enjoying superior advantages in having a wider range of resources at command. Here, however, the case is bravely altered and this is the first instance that we know of where the Italians avoid a plant visited by common bees. Is it from mere indifference or from positive repugnance? And are there any or many more cases of such avoidance?

Maj. Von Hruschka, the inventor and introducer of the honey-emptying machine, announces important improvements in the use of that implement which he will shortly communicate to the public.

The *Louisville (Ky.) Democrat*, of November 19, contains the following account of a recent extraordinary emigration or desertion of honey-bees—whether fact or fiction, we cannot say. If not a "moon hoax," we hope soon to receive from some correspondents residing near the scene, a more full account of the occurrence:

Extraordinary Exodus of Honey Bees— They Abandon their Winter Stores and Disappear.

One of the most remarkable occurrences that has ever come to our knowledge was related to us yesterday. Mr. James Broil, a farmer, who resides about seven miles from this city, on the river road, has for some time past been engaged extensively in raising honey bees, and with almost unprecedented success. He has lately rejoiced in as many as forty-five hives of the industrious little "cusses," and to use a homely phrase, they have been plying themselves like Turks, and making "slathers" of honey for the winter. A few mornings ago, however, Mr. Broil woke up to find his bees *non est*. They had "lit out" between two days, leaving no trace whatever of the point or region of country to which they had so unceremoniously migrated. There was not a solitary bee left to keep its lonely watch over the forty-five hives. As might be expected Farmer Broil was left in considerable of a dilemma, and immediately consulted all the authorities at his command in relation to the peculiar habits and freaks of the bee tribe. After wading through many volumes it occurred to him that some of his neighbors might be able to explain the whys and wherefores of this "bounty jumping" move on the part of his army of honey makers. He accordingly made a "bee-line" for the residence of his nearest neighbor, to consult him on the singular problem. To his utter surprise, he ascertained that his friend, who is also a "beeist," had met with the same loss in the same sudden manner, and was in the same perplexity as to the cause. They at once resolved on examining the hives, and it revealed to them the fact that each stand contained from sixty to seventy-five pounds of honey. This development led the two bee raisers to seek for further information, and in their rounds, for a circuit of twenty-five miles, they found that every hive had been deserted about the same time, and all of them were left full of honey. The farmers in that region are unable to account for this mysterious disappearance of their bees, and many theories have been advanced, but up to this time the problem remains unsolved. The opinion of the most of them is, that the mildness of the weather up to so late a season, caused this singular migration.

The description of Mr. J. L. Hubbard's Honey-Emptying Machine, intended for this number of the JOURNAL, had to be postponed till next month, as the diagram to accompany and illustrate it, could not be got ready in time.

We conclude, in this number, Mr. Lambrecht's essay on the cause, source, and cure of foulbrood; and shall, in our next, present Dr. Preuss's recent article on that subject contained in the *Bienenzeitung*, a lucid abstract of which has already been given to our readers in the communication from the Baroness Von Berlepsch, in the BEE JOURNAL for November. Though each of these inquirers assumes that he has traced the disease to its source, and their views consequently differ; we conceive that there is no irreconcilable difference between them, the observations of the one being in fact, in essentials, only the complement of the other.

To J. P. of C.—We have not seen Darwin's late work on "*The Variations of Animals and Plants under Domestication*," and cannot say whether the author indulges in any "new vagaries," or not. We presume that whatever facts he adduces are correctly stated: but we should incline to exercise great caution in following him, whenever he gets astride of his favorite hobby and throws his lasso around the neck of an *inference*. The hunter and his quarry are then rather apt to come to the ground together. Please complete your '*Strictures*,' and send them to us.

[For the American Bee Journal.]

That Bee Disease.

Since the date of my previous letter to the JOURNAL, my bees have continued to die as before, the disease finally attacking the Italians also, so that now I have not a single healthy stock left. The disease is not by any means confined to my apiary, as nearly all my neighbors have lost all their stocks. It is generally considered here to be something similar to cholera. The abdomen is swollen, and emits an extremely offensive fluid when crushed.

The first warning I had of anything being wrong with my bees, was an unusual activity about some of the hives, as though they were robbing, but I found they were not. A neighbor observed the same in his apiary.

The fact of the disease appearing simultaneously in apiaries several miles apart, would indicate that it is epidemic rather than contagious.

We have used the honey on the table for several weeks, and find it perfectly good and wholesome.

Some have ascribed it to a want of pollen, but I find my combs well supplied with bee-bread.

C. E. THORNE.

SELMA, OHIO, Dec. 7, 1868.

Mr. Thorne sent us some of the bees that died of the disease referred to above, but there is nothing in their appearance that could lead us even to conjecture the cause of their death. It cannot be foulbrood, for that does not affect or prove fatal to mature bees.

[For the American Bee Journal.]

Sundry Suggestions.

MR. EDITOR:—In a multitude of counsellors there is wisdom. I wish to make some suggestions through the columns of your most valuable JOURNAL, in reference to hives; but if on examination you find this communication in any way objectionable, cast it among your waste paper.

My suggestions may perhaps be considered by some as based on new and novel ideas, but the present and the future will satisfy practical bee-keepers as to their correctness. In my experience, (which I think has been considerable,) with all the various patent hives, I find they each have their objectionable features. The bee-keeping public have not got what they need in a way of a hive. There are certain known principles in the business, which experience has fully demonstrated may not be departed from; and yet by the inexperienced the dividing line between principles and the highway to destruction is not perceived. There are some common sense practical ideas that should be well understood for perfect success. Among these is prominent the fact that a swarm of bees, without the means of appropriating the animal heat generated in the hive, are in a helpless condition, in that they cannot manufacture the wax into comb, nor cause the eggs to hatch, nor the brood to mature in a temperature of less than 70° F. (See Langstroth on the Honey Bee.)

The difficulty that I wish to speak of occurs in making artificial swarms; which are made:—

First. Because the bees will not swarm naturally when they should.

Secondly. Because it is not economy to take the rest of their swarming when their queen is not present (as they frequently do) and go to the timber.

As a matter of dollars and cents, then, we are driven to the necessity of making swarms artificially, which mode I think is much the best. When so doing, and in order to induce bees to stay, we generally transfer one or two combs to the new hive. But now comes the trouble in all the hives yet invented. Take first the Langstroth, which is as good as any in this particular. When the comb or combs containing young bees and honey is so transferred, together with mature bees in sufficient number to make the usual sized swarm, they are placed in and up to one side of the hive (which is the most economical to the bees for preserving their animal heat,) and the bees will cluster to the side of the comb in the open space. This leaves on open space opposite the side of the comb 12 by 18 inches and 9 inches high, except that which is filled by the bees clustering. The bees cluster in that form for the purpose of generating animal heat, to keep the young brood new in the comb (which is the full size of the frame) from being chilled. This is a very unnatural condition for bees to cluster in. The animal heat so generated escapes into the open vacuum to the side of the comb and against the large flat surface of the hive. Its effect is thus almost entirely lost to the bees, and hence arti-

ficial swarms are inclined to linger when just made.

This lingering of artificial swarms has been observed by many, and has caused some to my knowledge to abandon artificial swarming, because, as they say, natural swarms always flourish better than artificial ones do.

To recapitulate. Our position is this, that if you should have a thousand swarms of bees in different kinds of hives, they would perhaps without exception all go to the top of the hive to commence building their combs downward. This seems to be the most natural with them; yet they can build them vertically up or down. They seem to go to the top, not because of any knowledge of duty or economy, but driven there to obtain the benefit of the animal heat, which always tends upward to the top of the hive. And if the hive is made tight, it will accumulate there in sufficient quantity for the benefit of the bees. But still the bees cannot at times generate it in sufficient quantity and temperature to fill the hive (when the bees first begin) more than $\frac{1}{4}$ or $\frac{1}{2}$ full—beginning at the top of course and building downward. Now it naturally occurs that if the combs are suspended the full length of the hive, and from top to bottom, that the bees in clustering against the side of said combs are in an unnatural cluster, and are unable to bring out their full effective force, either in the building of comb or gathering of honey, and hence they linger. In the American hive it is still worse on account of the increased depth of the combs.

Further—the bee-keeping public need something enabling them to take the surplus honey from the main hive without damage to the hive and brood, and thereby get nearly double the amount of surplus honey. They also want a better and unlimited control of the combs for various manipulating purposes, rearing queens, &c.

We want a hive from which combs, brood, and honey can be taken in proper shape for the purpose of rearing queens in nuclei, and returned without loss of comb or bees when the season for rearing has passed. Small combs cut out and inserted in small frames (which is the custom) are generally eaten up by worms or otherwise destroyed; and many of the bees used in nuclei for rearing queens are generally lost. Every pound of comb so destroyed costs the owner from sixteen to twenty pounds of honey.

In the present advancing tendency of bee-culture, most bee-keepers (at least the practical part) understand that they must keep on hand a supply of reserve queens for emergencies; and that it is not economy to allow a full stock of bees to rear queens. The nucleus system is therefore a necessity.

Query. With honey-emptying machines, where the operator wishes to empty the honey from a piece of comb containing also brood in all stages, does not the rapid revolution at which the machine carries the comb produce as it were a breeze of air within the machine, and thereby chill or otherwise injure the unsealed brood, especially that portion which has only been recently hatched? If so, we want a hive to meet

the emergency. The honey-emptying machine is one grand step in advance in the right direction; and together with the introduction of the Italian bee and the movable comb principle, has given the business a wonderful impulse. If the bee-keeper will but understand his own interest he cannot afford to do without these three improvements. By the way, however, for fear some one should think that I am recommending to the public something which I have to sell, I will state that I have neither queens, hives, nor machines for sale.

J. W. LEAY.

MONROE, IOWA, Oct. 9, 1868.

[For the American Bee Journal.]

Workers Reared in Drone Cells.

In an experiment of driving out two full stocks of bees that had not swarmed, and putting them in a hive of entirely drone combs, they raised all workers, except three or four drones that seemed to be raised through mistake, as they sometimes do in worker cells. What will the advocates of Mr. Wagner's theory say about the eggs, being impregnated, by being laid in small cells, when bees can raise workers in drone cells, and drones in worker cells? The drone cells were not taken down to the base and built up in worker cells, as might be expected.

Here is a point for Mr. Wagner's theory. The cells were changed from the middle to the outer end, making them the size of worker cells, with extra wax, making them in funnel shape on the inside, with some irregular cells here and there.

The experiment was tried in a scarce time of forage. In a time of a large yield of honey, or on especial occasions, such as swarming or re-nesting of queens, they would raise too large a portion of drones for profit, if having the combs ready for doing so; while the case is different if the combs are all of the worker kind. The few drones they might raise in the small cells do not generally amount to much, and the profits are proportionally greater, having little or no drone comb.

J. M. MARVIN.

ST. CHARLES, ILLS.

No full and precise statement of what is known as the "Wagner theory" has ever been made. The brief reference to it in Mr. Langstroth's treatise on "*The Hive and the Honey Bee*," is a mere outline of its general features as then held by us, subject to such modification as further observation and reflection might suggest. We have not since felt called on to present our views more in detail, nor do we propose to do so now, contenting ourselves with the remark that we do not regard the determination of sex in the worker egg, by the queen, like Dr. Küchenmeister, as a process altogether mechanical, nor like Dzierzon as an act of pure volition. We conceive the matter to be susceptible of explanation, without reducing the insect to a mere machine, or endowing it with faculties and powers surpassing those conferred on any higher order of creatures. The case stated in the foregoing communication does not militate against our views, but rather corroborates them.

The notion, revived by Harbison, that "the eggs to produce drones or males are generated in or produced from the one side or branch of the ovaries, and those producing females from the other side," was advanced and exploded long before he was born, unless he is a much older man than we suppose him to be. It could not even pass current with the *Buncomites* of those days.

[For the American Bee Journal.]

Queens Mating with Two Drones.

Queens often mate with a plurality of drones. I have known this since the fall of 1863, at which time I raised my first Italian queen. I watched one raised in an observing hive at that time very closely, and found that she mated with four different drones, bringing in the signs of co-urage very distinctly. I noticed that, after mating, the queen does not fly again the same day, but may do so again some other day.

Since the case mentioned, I have noticed the like of it with more than twenty queens. When we use the Köhler process, we should remember these facts. They can be proved.

I wish to state my opinion or theory based on the above observations. It may be stated thus:—A queen may mate with drones of different breeds, as Italians and blacks; and the spermatozooids will not influence each other, but the queen will. Consequently we may raise pure and impure queens from such a mother. The pure ones mating with pure drones of their own kind will produce pure stock, both drones and workers. If this theory is true, it will account for the various appearances in the progeny of hybridized queens. Prove all things and hold fast to that which is right.

DELHI, (MICH)

J. L. DAVIS.

[For the American Bee Journal.]

Queens Mating Twice.

I have observed this in the sense intended by J. E. Pond, Jr., on page 110 of the December number, to take place in a few instances. Queens seen returning, or soon after their return, with the plain marks of copulation were discovered, generally after three days had passed, to have again met the drone. In these cases it was indisputable that the queen had met different drones and on different days. I account for it by supposing that, as is the case with animals, copulation may sometimes take place without resulting in impregnation. These queens were carefully watched thereafter, but their progeny did not vary in color, as might be expected had they been impregnated twice by drones of different species. Of course, this proves nothing, as they probably had paired with pure Italian drones in both cases. It is my opinion, however, that, when impregnation is once effected, we have no reason to believe that any subsequent copulation takes place. I thus account for the occasional cases of obstruction owing to the retention of the male organ and consequent barrenness of the queen, on the ground that "accidents will happen."

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